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Subject: DRAFT - ESD tables updating cPAH CULs, TTL, and RALs

Hi, Priscilla – I haven't shared the draft text yet, as it's getting a thorough going over by EPA folks first. But I think it's safe to say that the ESD will go for public review (eventually) without LDWG's proposed elimination of cPAHs as COCs for different pathways. Rather, as shown in yellow highlights below, the existing CULs, TTL, and RALs will be updated using the HHRA assumptions and the new slope factor only.

Updated Record of Decision Tables 19, 21, and 28

ESD Table 19A – Cleanup Levels for PCBs, Arsenic, cPAHs, and Dioxins/Furans in Sediment for Human Health and Ecological COCs (RAOs 1, 2 and 4)

| COC | Cleanup Levels | | | Application Area and Depth | | | |
|----------------------------------|---|--------------------------------------|--|--|---|--|----------------------------------|
| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | RAO 4: Ecological (River Otter) | Basis for Cleanup Levels ^a | Spatial Scale of Application ^c | Spatial Compliance Measures ^d | Compliance Depth ^e |
| PCBs (µg/kg dw) | 2 | 1,300 | 128 - 159 | background (RAO 1) RBTC (RAO 2) RBTC (RAO 4) | LDW-wide | UCL95 | 0 – 10 cm |
| | NA | 500 | NA | RBTC | All Clamming Areas ^f | UCL95 | 0 – 45 cm |
| | NA | 1,700 | NA | RBTC | Individual Beaches ^g | UCL95 | 0 – 45 cm |
| Arsenic (mg/kg dw) | NA | 7 | NA | background | LDW-wide | UCL95 | 0 – 10 cm |
| | NA | 7 | NA | background | All Clamming Areas ^f | UCL95 | 0 – 45 cm |
| | NA | 7 | NA | background | Individual Beaches ^g | UCL95 | 0 – 45 cm |
| cPAH BaP-eq (µg/kg dw) | NA | 2800 ^f | NA | RBTC | LDW-wide | UCL95 | 0 – 10 cm |
| | NA | 1100 ^g | NA | RBTC | All Clamming Areas | UCL95 | 0 – 45 cm |
| | NA | 650 ^h | NA | RBTC | Individual Beaches ^g | UCL95 | 0 – 45 cm |
| Dioxins/Furans (ng TEQ/kg dw) | 2 | 37 | NA | background (RAO 1) RBTC (RAO 2) | LDW-wide | UCL95 | 0 – 10 cm |
| | NA | 13 | NA | RBTC | All Clamming Areas ^f | UCL95 | 0 – 45 cm |
| | NA | 28 | NA | RBTC | Individual Beaches ^g | UCL95 | 0 – 45 cm |

NOTE: where there are multiple cleanup levels for a cleanup area, the lowest cleanup level is shown in bold.

a. Background – see Table 3 and Section 5.3.4.1, RBTC – Risk-based threshold concentration (based on 1 in 1,000,000 excess cancer risk or HQ of 1)

b. In intertidal areas including beaches used for recreation and clamming, human-health direct contact cleanup levels (for PCBs, arsenic, cPAHs, and dioxins/furans) must be met in the top 45 cm because in intertidal areas exposure is likely through digging or other disturbances. Human health cleanup levels for RAO 1 (seafood consumption) and ecological cleanup levels must be met in surface sediments (top 10 cm). In subtidal areas, cleanup levels for all COCs must be met in the top 10 cm.

c. Clamming areas are identified in Figure 6.

d. Beach play areas are identified in Figure 6.

e. The UCL95 is the upper confidence limit on the mean. The determination of compliance with RAOs 1, 2 and 4 cleanup levels will be made by one of two methods: 1) comparison of the UCL 95 of LDW data with the RBTC or background-based cleanup levels, a statistical comparison of the distribution of LDW data to the OSV BOLD study background dataset (USACE et al. 2009) may be used. In either case, testing will use an alpha level of 0.05 and a two-tailed test. For background-based cleanup levels, a statistical comparison of the distribution of LDW data to the OSV BOLD study background dataset (USACE et al. 2009) may be used. In either case, testing will use an alpha level of 0.05 and a two-tailed test. ProUCL technical manual (EPA 2013b) or most current version). For either method, a sufficient number of samples must be collected to assure statistical power for the test.

f. Value increased by ESD from 380 to 2,800 µg/kg dw due to updated BaP slope factor (EPA, 2017).

g. Value increased by ESD from 150 to 1,100 µg/kg dw due to updated BaP slope factor (EPA, 2017).

h. Value increased by ESD from 90 to 650 µg/kg dw due to updated BaP slope factor (EPA, 2017).

i. Change in terminology: cPAH µg TEQ/kg dw and cPAH BaP-eq are the same.

ESD Table 21A - LDW Resident Fish and Shellfish Target Tissue Concentrations

| Species/Group and Tissue Type | Species ^{a,b} | Target Concentration | Source of Target Concentration ^c |
|---|------------------------|----------------------|---|
| PCBs (µg/kg ww) | | | |
| Benthic fish, fillet | English sole | 12 | Non-urban background |
| Pelagic fish, whole body | Perch | 1.8 | RBTC |
| Crab, edible meat | Dungeness crab | 1.1 | Non-urban background |
| Crab, whole body | Dungeness crab | 9.1 | Non-urban background |
| Clams | Eastern softshell clam | 0.42 | Non-urban background |
| Inorganic arsenic (mg/kg ww) | | | |
| Clams ^e | Eastern softshell clam | 0.09 | Non-urban background |
| cPAH BaP-eq^g (µg/kg ww) | | | |
| Clams ^e | Eastern softshell clam | 1.8 ^f | Species-specific RBTC ^d |
| Dioxin/furan TEQ (ng/kg ww) | | | |
| Benthic fish, whole body | English sole | 0.35 | Non-urban background |
| Crab, edible meat | Dungeness crab | 0.53 | Non-urban background |
| Crab, whole body | Dungeness crab | 2.0 | Non-urban background |
| Clams | Eastern softshell clam | 0.71 | Non-urban background |

a. Substitutions of similar species may be made if sufficient numbers of the species listed here are not available.

b. For non-urban background statistics, see also Table 4. Non-urban background is based on UCL95.

c. The statistic used to compare site data to target tissue concentrations will be based on the UCL95 for each compound listed for fish and clams in the waterway, and each compound for clams collected across all clamming areas in the waterway.

d. Species-specific RBTCs were used to determine target concentration when RBTCs exceed background, or background data were not available.

e. Only clam tissue values are shown for inorganic arsenic and cPAH TEQ because most of the risk associated with these COCs was associated with clams.

f. Changed by ESD due to updated BaP slope factor (EPA, 2017). Value increased from 0.24 to 1.8 µg/kg ww.

g. Change in terminology: cPAH µg TEQ/kg dw and cPAH BaP-eq are the same

ESD Table 28A. Remedial Action Levels, ENR Upper Limits, and Areas and Depths of Application

| | | | Intertidal Sediments (+11.3 ft MLLW to -4 ft MLLW) | | | | Subtidal Sediments (-4 ft MLLW and Deeper) | | | |
|--------------------------|----------------------|---------------|---|--------------------|---|--------------------|---|------------------|---|------------------|
| | | | Recovery Category 1 RALs, ENR ULs, and Application Depths | | Recovery Category 2 and 3 RALs, ENR ULs, and Application Depths | | Recovery Category 1 RALs, ENR ULs, and Application Depths | | Recovery Category 2 and 3 RALs, ENR ULs, and Application Depths | |
| Risk Driver COC | Units | Action Levels | Top 10 cm (4 in) | Top 45 cm (1.5 ft) | Top 10 cm (4 in) | Top 45 cm (1.5 ft) | Top 10 cm (4 in) | Top 60 cm (2 ft) | Top 10 cm (4 in) | Top 60 cm (2 ft) |
| Human Health Based RALs | | | | | | | | | | |
| PCBs (Total) | mg/kg OC | RAL | 12 | 12 | 12 | 65 | 12 | 12 | 12 | 195 |
| | | UL*for ENR | -- | -- | 36 | 97 | -- | -- | 36 | 195 |
| Arsenic (Total) | mg/kg dw | RAL | 57 | 28 | 57 | 28 | 57 | 57 | 57 | -- |
| | | UL*for ENR | -- | -- | 171 | 42 | -- | -- | 171 | -- |
| cPAH BaP-eq ^f | µg/kg dw | RAL | -- | 6,600 ^e | -- | 6,600 ^e | -- | -- | -- | -- |
| | | UL*for ENR | -- | -- | -- | 9,900 ^e | -- | -- | -- | -- |
| Dioxins/Furans | ng TEQ/kg dw | RAL | 25 | 28 | 25 | 28 | 25 | 25 | 25 | -- |
| | | UL*for ENR | -- | -- | 75 | 42 | -- | -- | 75 | -- |
| Benthic Protection RALs | | | | | | | | | | |
| 39SMS | Contaminant-specific | RAL | Benthic SCO | Benthic SCO | 2x Benthic SCO | -- | Benthic SCO | Benthic SCO | 2x Benthic SCO | -- |
| COCs ^d | | UL*for ENR | -- | -- | 3x RAL | -- | -- | -- | 3x RAL | -- |

Notes: This table reflects changes from the 2020 ESD to Table 28 in the ROD.

-- not applicable

-- RAL eliminated by ESD

a. The ENR Upper Limit (UL) is the highest concentration that would allow for application of ENR in the areas described. For areas with no ENR limit listed, ENR is not a currently designated treatment (see Table 20 in the ROD for further discussion).

b. Shoaled areas are those areas in federal navigation channel with sediment accumulation above the authorized depth including a 2 ft over-dredge depth that USACE uses to maintain the channel. The authorized channel depths are (1) from RM 0 to 2 (from Harbor Island to the First Avenue South Bridge), 30 ft below MLLW, (2) from RM 2 to RM 2.8 (from the First Avenue South Bridge to the Upper Turning Basin), 15 ft below MLLW, and (3) from RM 2.8 to 4.7 (Slip 4 to the Upper Turning Basin), 15 ft below MLLW. For shoaled areas, the compliance intervals will be determined during Remedial Design, these are typically 2 ft above the channel that are not shoaled, Recovery Categories 1 or 2 & 3 RALs apply as indicated in the other subtidal columns.

c. Applied only in potential vessel scour areas. These are defined as subtidal areas (below -4 ft MLLW) that are above -24 ft MLLW north of the 1st Ave South Bridge, and above -18 ft MLLW south of the 1st Ave South Bridge (see Figure 17 in the ROD).

d. There are 41 SMS COCs, but total PCBs and arsenic ENR ULs are based upon human health based RALs only (see Table 20 in the ROD).

e. RAL modified by ESD

f. Change in terminology: cPAH µg TEQ/kg dw and cPAH BaP-eq are the same



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